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## *Mortality of Master Mariners.* By F. G. P. Neison, Esq.

[Read before the Statistical Society of London, 18th June, 1849.]

The present contribution is brought under the attention of the Society with the view of increasing our knowledge of the causes which affect the mortality of Master Mariners. Apart from the scientific considerations connected with this question as a branch of vital statistics, it is believed that its discussion will receive additional interest from the immediate and direct application of the results to the purposes of Life Assurance Institutions.

The first portion of the following materials has been collected from the records of the "Master Mariners' Society," enrolled under the Friendly Societies' Acts, and includes the experience of the society for the fourteen years, 1835-48. The members consist exclusively of master mariners, and previous to admission, their health and habits undergo the scrutiny usually exercised by life offices and friendly societies. The benefits granted are of a twofold nature, the payments of specified sums of money on the death of the members, and a fixed rate of compensation in the event of the wreck or partial wreck of their vessels. The registers of the Society have been very accurately kept, and the following facts have been abstracted with great care by the secretary, on a schedule prepared for the purpose, and have been at three different times compared with the original books and examined by him, so that proper means have been taken to ensure accuracy.

The facts furnished by the secretary were then re-abstracted into other schedules, in the following manner.

First. All the members entering the Society in each year were distinguished and placed in separate groups according to their ages on admission, and the subsequent contingencies to be observed were, with their dates, duly noted; in the event of the death of a member, the peculiar form and manner of death, and in the event of the wreck or injury of a vessel, the particulars were always noted, and those members who did not fall under any of the causes of death, or withdrawal from the Society, were in like manner noted. The summary, therefore, of this schedule showed for the members entering in every year of the Society's existence, and for members of different ages, the results peculiar to each, and offered interesting means of comparison, and were therefore so collected into a second schedule, the summary of which showed, irrespective of the period of admission, the casualties of different kinds, happening at each term of life. The details of these schedules occupy so much space, that it is not proposed to bring them forward here, but at once to proceed to the following Table, No. I., on which they were finally abstracted. The following notes will be sufficient to explain the construction of this Table.

Column (*a*) Represents the age at which the admission of each member, or other contingent event connected therewith, took place.

(*b*) The number of members admitted at each age.

(*c*) The number of members remaining under observation from each preceding age, and is the residue of all those entering in each preceding age, and who have not become subject to any of the contingent events represented in the adjoining columns. For example, one member enters at the age of 19, and not falling under the events specified in the adjoining columns, he survives until the succeeding age, and comes under observation as a member of the age of 20.

(*d*) Again, two members enter at the age of 20, which, with the one remaining from the age of 19, make 3, come under observation at some time or other after completing the 19th year of their life, and before completing the 20th year, none of these become subject to any of the other events specified, and the whole 3 are therefore carried under observation to the following age, 21, when 15 other members entered, making 18 altogether under observation at the age of 21. Of these, 1, recently entered, remains alive on the 31st December, 1848, and therefore passes from under observation at the age of 21, and consequently 17 only come under observation in the next year; but at the age of 22, there are 28 members more admitted, which, added to 17, causes 45 to fall under observation in the 22nd year of life. In like manner, 77 members in all come under observation at the age of 23. Of these, 1 is lost during the course of that year, and 1 retires, while 1, who has recently entered, remains alive on the 31st December, 1848, and is, therefore, not longer observed; 3 members in all, therefore, go from under observation at the age of 23, and 74 are carried forward to the succeeding age of 24, which, with 43 admitted at that age, brings 117 members altogether under review at the age of 24.

(*e*) Represents the numbers dying at each age or term of life from natural causes.

(*f* to *k*), inclusive, Represent the numbers dying at each age or term of life from other causes.

(*l*) Shows the total of columns *e* to *k*, inclusive.

(*m*, *n*, *o*) Show the wrecks and loss of property.

(*p*) Represents those who have retired under the prescribed regulations.

(*q*) Represents the number of members alive on the 31st December, 1848, and who have not become subject to any of the contingent events represented in columns *e* to *k*, inclusive, and also in *p*.

(*r*) Contains the total of columns *l*, *p*, and *q*, and represents the number of members which cease to come under observation in any of the more advanced ages. For example, at the age of 25, column *d* represents 169 coming under observation; but before attaining the 26th year of age, 6 of these pass from observation, leaving 163 to come under the 26th year of age, as shown in column *c*.

(*s*) Represents one half of the numbers entering the Society at each year of life at which admissions take place, and is, therefore, one half of the numbers in column *b*. In like manner, column

(*t*) Represents one half the numbers in column *p*; and column

(*u*) The total of columns *s* and *t*; the purpose of these three columns will appear in the explanation of column

(*v*) Which represents the number of lives exposed a complete year to the risk of mortality from all causes while connected with the Society, and the figures in this column are produced by subtracting from the numbers in column *d* the numbers in column *u*, opposite the same age. As already stated, column *d* contains the gross number under observation at some time or other throughout the year of life set forth in column *a*; but as column *b* contains for each age the numbers who have just entered the Society, and as members, one with another, enter at different periods throughout the year, it has been found, by observation, that, on an average, each is,

TABLE I.

| Age. | Number Entered at each Age. | Number remaining under Observation from Age preceding. | Total Number under Observation at each Age. | Deaths. | | | | | | | Wrecks. | | | Retired. | Alive. | Total gone off. | Half Entered and half Discontinued. | | | Number Exposed to Risk. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Died. | Lost. | Violent Deaths. | Drowned. | Washed overboard. | Hung himself. | Total. | Wrecked. | Partial Wreck. | Fire. | | | | Entered. | Discontinued. | Total. | |
| *a* | *b* | *c* | *d* | *e* | *f* | *g* | *h* | *i* | *k* | *l* | *m* | *n* | *o* | *p* | *q* | *r* | *s* | *t* | *u* | *v* |
| 19 | 1 | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | ·5 | .. | ·5 | ·5 |
| 20 | 2 | 1 | 3 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | 1 | 2 |
| 21 | 15 | 3 | 18 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | 7·5 | .. | 7·5 | 10·5 |
| 22 | 28 | 17 | 45 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 14 | .. | 14 | 31 |
| 23 | 32 | 45 | 77 | .. | 1 | .. | .. | .. | .. | 1 | 1 | 1 | .. | 1 | 1 | 3 | 16 | ·5 | 16·5 | 60·5 |
| 24 | 43 | 74 | 117 | 1 | 2 | .. | .. | .. | .. | 3 | 5 | 1 | .. | 1 | 3 | 7 | 21·5 | ·5 | 22 | 95 |
| 25 | 59 | 110 | 169 | 1 | 1 | .. | .. | .. | .. | 2 | 3 | 2 | .. | 3 | 1 | 6 | 29·5 | 1·5 | 31 | 138 |
| 26 | 64 | 163 | 227 | 1 | 2 | .. | 2 | 2 | .. | 7 | 5 | .. | 1 | 3 | 6 | 16 | 32 | 1·5 | 33·5 | 193·5 |
| 27 | 57 | 211 | 268 | 2 | .. | .. | .. | .. | .. | 2 | 3 | 2 | .. | 6 | 9 | 17 | 28·5 | 3 | 31·5 | 236·5 |
| 28 | 66 | 251 | 317 | 4 | 2 | .. | .. | .. | .. | 6 | 6 | 4 | .. | 7 | 5 | 18 | 33 | 3·5 | 36·5 | 280·5 |
| 29 | 60 | 299 | 359 | 5 | 3 | .. | .. | .. | .. | 8 | 4 | 2 | .. | 9 | 11 | 28 | 30 | 4·5 | 34·5 | 324·5 |
| 30 | 88 | 331 | 419 | 4 | 3 | .. | 1 | .. | .. | 8 | 5 | 7 | .. | 10 | 12 | 30 | 44 | 5 | 49 | 370 |
| 31 | 54 | 389 | 443 | 2 | 2 | 1 | 1 | .. | .. | 6 | 8 | 5 | .. | 9 | 28 | 43 | 27 | 4·5 | 31·5 | 411·5 |
| 32 | 64 | 400 | 464 | 7 | 2 | .. | 1 | 3 | .. | 13 | 11 | .. | .. | 12 | 41 | 66 | 32 | 6 | 38 | 426 |
| 33 | 65 | 398 | 463 | 11 | .. | .. | 1 | .. | .. | 12 | 7 | 6 | .. | 13 | 37 | 62 | 32·5 | 6·5 | 39 | 424 |
| 34 | 93 | 401 | 494 | 4 | 4 | .. | 1 | .. | .. | 9 | 9 | 1 | .. | 7 | 25 | 41 | 46·5 | 3·5 | 50 | 444 |
| 35 | 77 | 453 | 530 | 5 | 7 | .. | 1 | .. | .. | 13 | 14 | 4 | 1 | 5 | 38 | 56 | 38·5 | 2·5 | 41 | 489 |
| 36 | 63 | 474 | 537 | 2 | 2 | 1 | 1 | 1 | .. | 7 | 12 | 3 | .. | 15 | 33 | 55 | 31·5 | 7·5 | 39 | 498 |
| 37 | 59 | 482 | 541 | 7 | 1 | .. | .. | .. | .. | 8 | 10 | 5 | .. | 11 | 57 | 76 | 29·5 | 5·5 | 35 | 506 |
| 38 | 77 | 465 | 542 | 11 | 2 | 1 | 1 | .. | .. | 15 | 14 | .. | .. | 8 | 41 | 64 | 38·5 | 4 | 42·5 | 499·5 |
| 39 | 70 | 478 | 548 | 6 | 1 | .. | 2 | .. | .. | 9 | 9 | 3 | .. | 10 | 35 | 54 | 35 | 5 | 40 | 508 |
| 40 | 58 | 494 | 552 | 6 | 6 | 1 | 2 | 3 | .. | 18 | 12 | 5 | .. | 9 | 44 | 71 | 29 | 4·5 | 33·5 | 518·5 |
| 41 | 42 | 481 | 523 | 6 | 3 | 1 | .. | 1 | .. | 11 | 7 | 9 | .. | 11 | 47 | 69 | 21 | 5·5 | 26·5 | 496·5 |
| 42 | 33 | 454 | 487 | 10 | .. | .. | 1 | .. | .. | 11 | 6 | 2 | .. | 11 | 51 | 73 | 16·5 | 5·5 | 22 | 465 |
| 43 | 46 | 414 | 460 | 9 | 7 | .. | 1 | .. | .. | 7 | 8 | 3 | .. | 7 | 47 | 71 | 23 | 3·5 | 26·5 | 433·5 |
| 44 | 44 | 389 | 433 | 6 | 1 | .. | .. | .. | .. | 7 | 11 | 3 | .. | .. | 43 | 50 | 22 | .. | 22 | 411 |
| 45 | 24 | 383 | 407 | 3 | .. | .. | 2 | 1 | .. | 6 | 3 | .. | .. | 10 | 43 | 59 | 12 | 5 | 17 | 390 |
| 46 | 15 | 348 | 363 | 9 | 1 | .. | 1 | .. | .. | 11 | 6 | 5 | 1 | 5 | 42 | 58 | 7·5 | 2·5 | 10 | 353 |
| 47 | 24 | 305 | 329 | 3 | 1 | .. | 1 | .. | .. | 5 | 2 | 4 | .. | 9 | 54 | 68 | 12 | 4·5 | 16·5 | 312·5 |
| 48 | 28 | 261 | 289 | 7 | 2 | .. | .. | .. | .. | 9 | 6 | .. | .. | 8 | 44 | 61 | 14 | 4 | 18 | 271 |
| 49 | 28 | 228 | 256 | 5 | 1 | 1 | 1 | .. | .. | 8 | 2 | 1 | .. | 2 | 36 | 46 | 14 | 1 | 15 | 241 |
| 50 | 13 | 210 | 223 | 6 | 3 | 1 | .. | .. | 1 | 11 | 2 | 4 | .. | 7 | 29 | 47 | 6·5 | 3·5 | 10 | 213 |
| 51 | 4 | 176 | 180 | 3 | .. | .. | 1 | .. | .. | 4 | 6 | 1 | .. | 5 | 21 | 30 | 2 | 2·5 | 4·5 | 175·5 |
| 52 | 12 | 150 | 162 | 5 | 2 | .. | 1 | .. | .. | 8 | 6 | 2 | .. | 5 | 25 | 38 | 6 | 2·5 | 8·5 | 153·5 |
| 53 | 15 | 124 | 139 | 1 | .. | .. | .. | .. | .. | 1 | 3 | 1 | 1 | 7 | 13 | 21 | 7·5 | 3·5 | 11 | 128 |
| 54 | 11 | 118 | 129 | .. | .. | .. | .. | 1 | .. | 1 | 3 | .. | .. | 2 | 18 | 21 | 5·5 | 1 | 6·5 | 122·5 |
| 55 | 5 | 108 | 113 | 7 | .. | .. | .. | .. | .. | 7 | .. | 2 | 1 | 4 | 14 | 25 | 2·5 | 2 | 4·5 | 108·5 |
| 56 | 4 | 88 | 92 | 1 | .. | .. | .. | .. | .. | 1 | 1 | .. | .. | 4 | 10 | 15 | 2 | 2 | 4 | 88 |
| 57 | .. | 77 | 77 | 1 | .. | .. | .. | .. | .. | 1 | 1 | .. | .. | 4 | 12 | 17 | .. | 2 | 2 | 75 |
| 58 | 3 | 60 | 63 | 1 | .. | .. | .. | .. | .. | 1 | .. | 1 | .. | 2 | 8 | 11 | 1·5 | 1 | 2·5 | 60·5 |
| 59 | .. | 52 | 52 | 1 | .. | .. | .. | .. | .. | 1 | .. | .. | .. | 1 | 11 | 13 | .. | ·5 | ·5 | 51·5 |
| 60 | .. | .. | 39 | 2 | .. | .. | .. | .. | .. | 2 | 1 | 1 | .. | .. | 12 | 14 | .. | .. | .. | 39 |
| 61 | .. | .. | 25 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 3 | 3 | .. | .. | .. | 25 |
| 62 | .. | .. | 22 | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | 5 | 5 | .. | .. | .. | 22 |
| 63 | .. | .. | 17 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 3 | 4 | .. | ·5 | ·5 | 16·5 |
| 64 | .. | .. | 13 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 5 | 5 | .. | .. | .. | 13 |
| 65 | .. | .. | 8 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 3 | 4 | .. | ·5 | ·5 | 7·5 |
| 66 | .. | .. | 4 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 2 | 2 | .. | .. | .. | 4 |
| 67 | .. | .. | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 2 | 2 | .. | .. | .. | 2 |
| 68 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| | 1,546 | | 12,041 | 165 | 62 | 7 | 23 | 12 | 1 | 270 | 213 | 90 | 5 | 245 | 1,031 | 1,546 | 773·0 | 122·5 | 895·5 | 11145·5 |

during the year of admission, exposed to only six months', or one half-year's mortality, and hence column $s$ represents that amount of risk for all the members just admitted. In like manner, column $t$ represents the amount of risk to which members retiring from the Society are exposed, on the hypothesis that, one with another, the discontinuances will take place in the middle of the year. It thus appears, that as column $u$ is the total of $s$ and $t$, that it shows the proper number to be deducted from the quantities in column $d$, in order to find the number exposed to the risk of a whole year's mortality.

From this Table, it will be seen that of 270 deaths, 165 only have taken place from natural causes, 62 were lost with their vessels, 7 took place by violent means, such as falling of masts, and loss of life in engagements with pirates, 23 were drowned, 12 washed overboard, and 1 hung himself.

The following is a condensed abstract of this Table, and represents the rate of mortality from all causes taking place among master mariners, at different periods of life.

ABSTRACT A.

| Ages. | Number exposed to the risk of Mortality from all causes. | Died. | Mortality, per cent. |
|---|---|---|---|
| 19—20 | 2·5 | .... | .... |
| 21—25 | 335·0 | 6 | 1·791 |
| 26—30 | 1,405·0 | 31 | 2·206 |
| 31—35 | 2,194·5 | 53 | 2·415 |
| 36—40 | 2,530·0 | 57 | 2·253 |
| 41—45 | 2,196·0 | 52 | 2·368 |
| 46—50 | 1,390·5 | 44 | 3·164 |
| 51—55 | 688·0 | 21 | 3·052 |
| 56—60 | 314·0 | 6 | 1·911 |
| 61—65 | 84·0 | .... | .... |
| 66—68 | 6·0 | .... | .... |
| Total | 11,145·5 | 270 | 2·423 |

It will thus be seen that throughout the Table, the rate of mortality is high, and attention is next directed to Table II., which exhibits the mortality that has taken place from natural causes only. In this Table, it will be observed that columns $a$ to $e$ inclusive, are exactly similar to the first five columns of Table I., but that the group of columns headed "discontinued," in Table II., consists of columns $f$, $g$, $h$, $i$, and $k$, of Table I., with the addition of $p$. The reason of this will immediately appear on reflection. In Table I., the mortality from all causes was considered, and, therefore, in the determination of the number exposed to risk, the members retiring or withdrawing from the Society, only come under the head of "discontinued," but in Table II., the mortality from natural causes only is to be measured, and, therefore, the "discontinued" group will consist not only of the retired members, but also of those withdrawing or removing from the Society by all other causes, except natural death; consequently column $s$ is found by deducting from column $d$ the sum of columns $p$ and $q$, or column $r$. The rest of Table II. will be sufficiently understood by what has been said of Table I.

## TABLE II.

| Age. | Number Entered at each Age. | Number remaining under Observation from Age preceding. | Total Number under Observation at each Age. | Died. | Discontinued. | | | | | | | Alive. | Total gone off. | Half Entered and half Discontinued. | | | Number Exposed to Risk. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Lost. | Violent Death. | Drowned. | Washed overboard. | Hung himself. | Retired. | Total. | | | Entered. | Discontinued. | Total. | |
| *a* | *b* | *c* | *d* | *e* | *f* | *g* | *h* | *i* | *k* | *l* | *m* | *n* | *o* | *p* | *q* | *r* | *s* |
| 19.. | 1 | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | ·5 | .. | ·5 | ·5 |
| 20.. | 2 | 1 | 3 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | 1 | 2 |
| 21.. | 15 | 3 | 18 | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | 7·5 | .. | 7·5 | 10·5 |
| 22.. | 28 | 17 | 45 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 14 | .. | 14 | 31 |
| 23.. | 32 | 45 | 77 | .. | 1 | .. | .. | .. | .. | 1 | 2 | 1 | 3 | 16 | 1 | 17 | 60 |
| 24.. | 43 | 74 | 117 | 1 | 2 | .. | .. | .. | .. | 1 | 3 | 3 | 7 | 21·5 | 1·5 | 23 | 94 |
| 25.. | 59 | 110 | 169 | 1 | 1 | .. | .. | .. | .. | 3 | 4 | 1 | 6 | 29·5 | 2 | 31·5 | 137·5 |
| 26.. | 64 | 163 | 227 | 1 | 2 | .. | 2 | 2 | .. | 3 | 9 | 6 | 16 | 32 | 4·5 | 36·5 | 190·5 |
| 27.. | 57 | 211 | 268 | 2 | .. | .. | .. | .. | .. | 6 | 6 | 9 | 17 | 28·5 | 3 | 31·5 | 236·5 |
| 28.. | 66 | 251 | 317 | 4 | 2 | .. | .. | .. | .. | 7 | 9 | 5 | 18 | 33 | 4·5 | 37·5 | 279·5 |
| 29.. | 60 | 299 | 359 | 5 | 3 | .. | .. | .. | .. | 9 | 12 | 11 | 28 | 30 | 6 | 36 | 323 |
| 30.. | 88 | 331 | 419 | 4 | 3 | .. | 1 | .. | .. | 10 | 14 | 12 | 30 | 44 | 7 | 51 | 368 |
| 31.. | 54 | 389 | 443 | 2 | 2 | 1 | 1 | .. | .. | 9 | 13 | 28 | 43 | 27 | 6·5 | 33·5 | 409·5 |
| 32.. | 64 | 400 | 464 | 7 | 2 | .. | 1 | 3 | .. | 12 | 18 | 41 | 66 | 32 | 9 | 41 | 423 |
| 33.. | 65 | 398 | 463 | 11 | .. | .. | 1 | .. | .. | 13 | 14 | 37 | 62 | 32·5 | 7 | 39·5 | 423·5 |
| 34.. | 93 | 401 | 494 | 4 | 4 | .. | 1 | .. | .. | 7 | 12 | 25 | 41 | 46·5 | 6 | 52·5 | 441·5 |
| 35.. | 77 | 453 | 530 | 5 | 7 | .. | 1 | .. | .. | 5 | 13 | 38 | 56 | 38·5 | 6·5 | 45 | 485 |
| 36.. | 63 | 474 | 537 | 2 | 2 | 1 | 1 | 1 | .. | 15 | 20 | 33 | 55 | 31·5 | 10 | 41·5 | 495·5 |
| 37.. | 59 | 482 | 541 | 7 | 1 | .. | .. | .. | .. | 11 | 12 | 57 | 76 | 29·5 | 6 | 35·5 | 505·5 |
| 38.. | 77 | 465 | 542 | 11 | 2 | 1 | 1 | .. | .. | 8 | 12 | 41 | 64 | 38·5 | 6 | 44·5 | 497·5 |
| 39.. | 70 | 478 | 548 | 6 | 1 | .. | 2 | .. | .. | 10 | 13 | 35 | 54 | 35 | 6·5 | 41·5 | 506·5 |
| 40.. | 58 | 494 | 552 | 6 | 6 | 1 | 2 | 3 | .. | 9 | 21 | 44 | 71 | 29 | 10·5 | 39·5 | 512·5 |
| 41.. | 42 | 481 | 523 | 6 | 3 | 1 | .. | 1 | .. | 11 | 16 | 47 | 69 | 21 | 8 | 29 | 494 |
| 42.. | 33 | 454 | 487 | 10 | .. | .. | 1 | .. | .. | 11 | 12 | 51 | 73 | 16·5 | 6 | 22·5 | 464·5 |
| 43.. | 46 | 414 | 460 | 9 | 7 | .. | 1 | .. | .. | 7 | 15 | 47 | 71 | 23 | 7·5 | 30·5 | 429·5 |
| 44.. | 44 | 389 | 433 | 6 | 1 | .. | .. | .. | .. | .. | 1 | 43 | 50 | 22 | ·5 | 22·5 | 410·5 |
| 45.. | 24 | 383 | 407 | 3 | .. | .. | 2 | 1 | .. | 10 | 13 | 43 | 59 | 12 | 6·5 | 18·5 | 388·5 |
| 46.. | 15 | 348 | 363 | 9 | 1 | .. | 1 | .. | .. | 5 | 7 | 42 | 58 | 7·5 | 3·5 | 11 | 352 |
| 47.. | 24 | 305 | 329 | 3 | 1 | .. | 1 | .. | .. | 9 | 11 | 54 | 68 | 12 | 5·5 | 17·5 | 311·5 |
| 48.. | 28 | 261 | 289 | 7 | 2 | .. | .. | .. | .. | 8 | 10 | 44 | 61 | 14 | 5 | 19 | 270 |
| 49.. | 28 | 228 | 256 | 5 | 1 | 1 | 1 | .. | .. | 2 | 5 | 36 | 46 | 14 | 2·5 | 16·5 | 239·5 |
| 50.. | 13 | 210 | 223 | 6 | 3 | 1 | .. | .. | 1 | 7 | 12 | 29 | 47 | 6·5 | 6 | 12·5 | 210·5 |
| 51.. | 4 | 176 | 180 | 3 | .. | .. | 1 | .. | .. | 5 | 6 | 21 | 30 | 2 | 3 | 5 | 175 |
| 52.. | 12 | 150 | 162 | 5 | 2 | .. | 1 | .. | .. | 5 | 8 | 25 | 38 | 6 | 4 | 10 | 152 |
| 53.. | 15 | 124 | 139 | 1 | .. | .. | .. | .. | .. | 7 | 7 | 13 | 21 | 7·5 | 3·5 | 11 | 128 |
| 54.. | 11 | 118 | 129 | .. | .. | .. | .. | 1 | .. | 2 | 3 | 18 | 21 | 5·5 | 1·5 | 7 | 122 |
| 55.. | 5 | 108 | 113 | 7 | .. | .. | .. | .. | .. | 4 | 4 | 14 | 25 | 2.5 | 2 | 4·5 | 108·5 |
| 56.. | 4 | 88 | 92 | 1 | .. | .. | .. | .. | .. | 4 | 4 | 10 | 15 | 2 | 2 | 4 | 88 |
| 57.. | .. | 77 | 77 | 1 | .. | .. | .. | .. | .. | 4 | 4 | 12 | 17 | .. | 2 | 2 | 75 |
| 58.. | 3 | 60 | 63 | 1 | .. | .. | .. | .. | .. | 2 | 2 | 8 | 11 | 1·5 | 1 | 2·5 | 60·5 |
| 59.. | .. | 52 | 52 | 1 | .. | .. | .. | .. | .. | 1 | 1 | 11 | 13 | .. | ·5 | ·5 | 51·5 |
| 60.. | .. | .. | 39 | 2 | .. | .. | .. | .. | .. | .. | .. | 12 | 14 | .. | .. | .. | 39 |
| 61.. | .. | .. | 25 | .. | .. | .. | .. | .. | .. | .. | .. | 3 | 3 | .. | .. | .. | 25 |
| 62.. | .. | .. | 22 | .. | .. | .. | .. | .. | .. | .. | .. | 5 | 5 | .. | .. | .. | 22 |
| 63.. | .. | .. | 17 | .. | .. | .. | .. | .. | .. | 1 | 1 | 3 | 4 | .. | ·5 | ·5 | 16·5 |
| 64.. | .. | .. | 13 | .. | .. | .. | .. | .. | .. | .. | .. | 5 | 5 | .. | .. | .. | 13 |
| 65.. | .. | .. | 8 | .. | .. | .. | .. | .. | .. | 1 | 1 | 3 | 4 | .. | ·5 | ·5 | 7·5 |
| 66.. | .. | .. | 4 | .. | .. | .. | .. | .. | .. | .. | .. | 2 | 2 | .. | .. | .. | 4 |
| 67.. | .. | .. | 2 | .. | .. | .. | .. | .. | .. | .. | .. | 2 | 2 | .. | .. | .. | 2 |
| 68.. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| | 1,546 | | 12,041 | 165 | 62 | 7 | 23 | 12 | 1 | 245 | 350 | 1,031 | 1,546 | 773·0 | 175·0 | 948·0 | 11093·0 |

The following abstract of this Table will make the results better understood.

ABSTRACT B.

| Ages. | Number exposed to the risk of Mortality from natural causes. | Died. | Mortality, per cent. |
|---|---|---|---|
| 19—20........... | 2·5 | .... | .... |
| 21—25........... | 333·0 | 2 | ·600 |
| 26—30........... | 1,397·5 | 16 | 1·145 |
| 31—35........... | 2,182·5 | 29 | 1·324 |
| 36—40........... | 2,517·5 | 32 | 1·231 |
| 41—45........... | 2,187·0 | 34 | 1·555 |
| 46—50........... | 1,383·5 | 30 | 2·168 |
| 51—55........... | 685·5 | 16 | 2·480 |
| 56—60........... | 314·0 | 6 | 1·910 |
| 61—65........... | 84·0 | .... | .... |
| 66—68........... | 6·0 | .... | .... |
| Total........ | 11,093·0 | 165 | 1·488 |

The preceding, which show the rate of mortality from natural causes, will be found to be much above that for the male population of the country generally at the same ages.

The next part of this subject to be considered, is the rate of mortality from accidental causes, or rather those causes peculiar to the occupation of master mariners. Table III. gives those results, and it will on consideration soon appear that in this instance, the "discontinued" group must, for like reasons to those assigned in explanation of the Table II., consist of the members who have died from natural causes, and those who have retired from the Society, that is, the numbers composing columns *e* and *p* of Table I. It will thus be found, that in Tables I., II., and III., the numbers exposed to the risk of mortality differ, and this arises from the fact that the peculiar contingency to be measured is different in each instance, and, hence, the difference of the quantities forming the last column of each table. Table I. measures the sum of the force of the two causes prevailing in each of the other two tables, and, therefore, the greater number exposed to risk.

## TABLE III.

| Age. | Number Entered at each Age. | Number remaining under Observation from Age preceding. | Total Number under Observation at each Age. | Discontinued. | | | Deaths. | | | | | | Alive. | Total gone off. | Half Entered and half Discontinued. | | | Number Exposed to Risk. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Died. | Retired. | Total. | Lost. | Violent Death. | Drowned. | Washed overboard. | Hung himself. | Total. | | | Entered. | Discontinued. | Total. | |
| *a* | *b* | *c* | *d* | *e* | *f* | *g* | *h* | *i* | *k* | *l* | *m* | *n* | *o* | *p* | *q* | *r* | *s* | *t* |
| 19 | 1 | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | ·5 | .. | ·5 | ·5 |
| 20 | 2 | 1 | 3 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | 1 | 2 |
| 21 | 15 | 3 | 18 | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1 | 7·5 | .. | 7·5 | 10·5 |
| 22 | 28 | 17 | 45 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 14 | .. | 14 | 31 |
| 23 | 32 | 45 | 77 | .. | 1 | 1 | 1 | .. | .. | .. | .. | 1 | 1 | 3 | 16 | ·5 | 16·5 | 60·5 |
| 24 | 43 | 74 | 117 | 1 | 1 | 2 | 2 | .. | .. | .. | .. | 2 | 3 | 7 | 21·5 | 1 | 22·5 | 94·5 |
| 25 | 59 | 110 | 169 | 1 | 3 | 4 | 1 | .. | .. | .. | .. | 1 | 1 | 6 | 29·5 | 2 | 31·5 | 137·5 |
| 26 | 64 | 163 | 227 | 1 | 3 | 4 | 2 | .. | 2 | 2 | .. | 6 | 6 | 16 | 32 | 2 | 34 | 193 |
| 27 | 57 | 211 | 268 | 2 | 6 | 8 | .. | .. | .. | .. | .. | .. | 9 | 17 | 28·5 | 4 | 32·5 | 235·5 |
| 28 | 66 | 251 | 317 | 4 | 7 | 11 | 2 | .. | .. | .. | .. | 2 | 5 | 18 | 33 | 5·5 | 38·5 | 278·5 |
| 29 | 60 | 299 | 359 | 5 | 9 | 14 | 3 | .. | .. | .. | .. | 3 | 11 | 28 | 30 | 7 | 37 | 322 |
| 30 | 88 | 331 | 419 | 4 | 10 | 14 | 3 | .. | 1 | .. | .. | 4 | 12 | 30 | 44 | 7 | 51 | 368 |
| 31 | 54 | 389 | 443 | 2 | 9 | 11 | 2 | 1 | 1 | .. | .. | 4 | 28 | 43 | 27 | 5·5 | 32·5 | 410·5 |
| 32 | 64 | 400 | 464 | 7 | 12 | 19 | 2 | .. | 1 | 3 | .. | 6 | 41 | 66 | 32 | 9·5 | 41·5 | 422·5 |
| 33 | 65 | 398 | 463 | 11 | 13 | 24 | .. | .. | 1 | .. | .. | 1 | 37 | 62 | 32·5 | 12 | 44·5 | 418·5 |
| 34 | 93 | 401 | 494 | 4 | 7 | 11 | 4 | .. | 1 | .. | .. | 5 | 25 | 41 | 46·5 | 5·5 | 52 | 442 |
| 35 | 77 | 453 | 530 | 5 | 5 | 10 | 7 | .. | 1 | .. | .. | 8 | 38 | 56 | 38·5 | 5 | 43·5 | 486·5 |
| 36 | 63 | 474 | 537 | 2 | 15 | 17 | 2 | 1 | 1 | 1 | .. | 5 | 33 | 55 | 31·5 | 8·5 | 40 | 497 |
| 37 | 59 | 482 | 541 | 7 | 11 | 18 | 1 | .. | .. | .. | .. | 1 | 57 | 76 | 29·5 | 9 | 38·5 | 502·5 |
| 38 | 77 | 465 | 542 | 11 | 8 | 19 | 2 | 1 | 1 | .. | .. | 4 | 41 | 64 | 38·5 | 9·5 | 48 | 494 |
| 39 | 70 | 478 | 548 | 6 | 10 | 16 | 1 | .. | 2 | .. | .. | 3 | 35 | 54 | 35 | 8 | 43 | 505 |
| 40 | 58 | 494 | 552 | 6 | 9 | 15 | 6 | 1 | 2 | 3 | .. | 12 | 44 | 71 | 29 | 7·5 | 36·5 | 515·5 |
| 41 | 42 | 481 | 523 | 6 | 11 | 17 | 3 | 1 | .. | 1 | .. | 5 | 47 | 69 | 21 | 8·5 | 29·5 | 493·5 |
| 42 | 33 | 454 | 487 | 10 | 11 | 21 | .. | .. | 1 | .. | .. | 1 | 51 | 73 | 16·5 | 10·5 | 27 | 460 |
| 43 | 46 | 414 | 460 | 9 | 7 | 16 | 7 | .. | 1 | .. | .. | 8 | 47 | 71 | 23 | 8 | 31 | 429 |
| 44 | 44 | 389 | 433 | 6 | .. | 6 | 1 | .. | .. | .. | .. | 1 | 43 | 50 | 22 | 3 | 25 | 408 |
| 45 | 24 | 383 | 407 | 3 | 10 | 13 | .. | .. | 2 | 1 | .. | 3 | 43 | 59 | 12 | 6·5 | 18·5 | 388·5 |
| 46 | 15 | 348 | 363 | 9 | 5 | 14 | 1 | .. | 1 | .. | .. | 2 | 42 | 58 | 7·5 | 7 | 14·5 | 348·5 |
| 47 | 24 | 305 | 329 | 3 | 9 | 12 | 1 | .. | 1 | .. | .. | 2 | 54 | 68 | 12 | 6 | 18 | 311 |
| 48 | 28 | 261 | 289 | 7 | 8 | 15 | 2 | .. | .. | .. | .. | 2 | 44 | 61 | 14 | 7·5 | 21·5 | 267·5 |
| 49 | 28 | 228 | 256 | 5 | 2 | 7 | 1 | 1 | 1 | .. | .. | 3 | 36 | 46 | 14 | 3·5 | 17·5 | 238·5 |
| 50 | 13 | 210 | 223 | 6 | 7 | 13 | 3 | 1 | .. | .. | 1 | 5 | 29 | 47 | 6·5 | 6·5 | 13 | 210 |
| 51 | 4 | 176 | 180 | 3 | 5 | 8 | .. | .. | 1 | .. | .. | 1 | 21 | 30 | 2 | 4 | 6 | 174 |
| 52 | 12 | 150 | 162 | 5 | 5 | 10 | 2 | .. | 1 | .. | .. | 3 | 25 | 38 | 6 | 5 | 11 | 161 |
| 53 | 15 | 124 | 139 | 1 | 7 | 8 | .. | .. | .. | .. | .. | .. | 13 | 21 | 7·5 | 4 | 11·5 | 127·5 |
| 54 | 11 | 118 | 129 | .. | 2 | 2 | .. | .. | .. | 1 | .. | 1 | 18 | 21 | 5·5 | 1 | 6·5 | 122·5 |
| 55 | 5 | 108 | 113 | 7 | 4 | 11 | .. | .. | .. | .. | .. | .. | 14 | 25 | 2·5 | 5·5 | 8 | 105 |
| 56 | 4 | 88 | 92 | 1 | 4 | 5 | .. | .. | .. | .. | .. | .. | 10 | 15 | 2 | 2·5 | 4·5 | 87·5 |
| 57 | .. | 77 | 77 | 1 | 4 | 5 | .. | .. | .. | .. | .. | .. | 12 | 17 | .. | 2·5 | 2·5 | 74·5 |
| 58 | 3 | 60 | 63 | 1 | 2 | 3 | .. | .. | .. | .. | .. | .. | 8 | 11 | 1·5 | 1·5 | 3 | 60 |
| 59 | .. | 52 | 52 | 1 | 1 | 2 | .. | .. | .. | .. | .. | .. | 11 | 13 | .. | 1 | 1 | 51 |
| 60 | .. | .. | 39 | 2 | .. | 2 | .. | .. | .. | .. | .. | .. | 12 | 14 | .. | 1 | 1 | 38 |
| 61 | | .. | 25 | .. | .. | .. | .. | .. | .. | .. | .. | .. | 3 | 3 | .. | .. | .. | 25 |
| 62 | .. | .. | 22 | .. | .. | .. | .. | .. | .. | .. | .. | .. | 5 | 5 | .. | .. | .. | 22 |
| 63 | .. | .. | 17 | . | 1 | 1 | .. | .. | .. | .. | .. | .. | 3 | 4 | .. | ·5 | ·5 | 16·5 |
| 64 | .. | .. | 13 | .. | .. | .. | .. | .. | .. | .. | .. | .. | 5 | 5 | .. | .. | .. | 13 |
| 65 | .. | .. | 8 | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | 3 | 4 | .. | ·5 | ·5 | 7·5 |
| 66 | .. | .. | 4 | .. | .. | .. | .. | .. | .. | .. | .. | .. | 2 | 2 | .. | .. | .. | 4 |
| 67 | .. | .. | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | 2 | 2 | .. | .. | .. | 2 |
| 68 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| | 1,546 | | 12,041 | 165 | 245 | 410 | 62 | 7 | 23 | 12 | 1 | 105 | 1,031 | 1,546 | 773·0 | 205·0 | 978·0 | 11063·0 |

The following abstract of this Table shows that in each of the three earlier quinquennial periods of life, the mortality from accidental causes is greater than in the more advanced periods of life, and should more extended inquiries confirm these results, it would be a curious circumstance to know that advanced years and increased experience should enable master mariners to avoid many of the causes which occasion loss of life. There are many ways in which amongst more experienced captains this immunity from death may be accounted for, such as being in the command of a higher class of vessels, but it is quite unnecessary to speculate on the cause.

ABSTRACT C.

| Ages. | Number exposed to the risk of Death from accidental causes. | Died. | Mortality, per cent. |
|---|---|---|---|
| 19—20………… | 2·5 | …. | …. |
| 21—25………… | 334·0 | 4 | 1·197 |
| 26—30………… | 1,397·0 | 15 | 1·074 |
| 31—35………… | 2,180·0 | 24 | 1·101 |
| 36—40………… | 2,514·0 | 25 | ·995 |
| 41—45………… | 2,179·0 | 18 | ·826 |
| 46—50………… | 1,375·5 | 14 | 1·018 |
| 51—55………… | 680·0 | 5 | ·737 |
| 56—60………… | 311·0 | …. | …. |
| 61—65………… | 84·0 | …. | …. |
| 66—68………… | 6·0 | …. | …. |
| Total…….. | 11,063·0 | 105 | 0·949 |

Having thus determined the ratio of the loss of life from the various causes among master mariners, it may be interesting to show the relation between the actual number of deaths, which has taken place from each of these causes, and that which would have happened, had the number of deaths been the same as among the male population of England and Wales, at the same ages.

ABSTRACT D.

| Ages. | Number of Deaths from | | | |
|---|---|---|---|---|
| | All Causes. | | Natural Causes. | |
| | Among Master Mariners. | Male Population of England and Wales. | Among Master Mariners. | Male Population of England and Wales. |
| 19—20 | 0 | ·019 | 0 | ·019 |
| 21—25 | 6 | 2·935 | 2 | 2·917 |
| 26—30 | 31 | 14·022 | 16 | 13·947 |
| 31—35 | 53 | 23·328 | 29 | 23·130 |
| 36—40 | 57 | 29·272 | 32 | 29·133 |
| 41—45 | 52 | 28·965 | 34 | 28·847 |
| 46—50 | 44 | 21·692 | 30 | 21·583 |
| 51—55 | 21 | 13·313 | 16 | 13·264 |
| 56—60 | 6 | 7·943 | 6 | 7·943 |
| 61—65 | .... | 2·918 | .... | 2·918 |
| 66—68 | .... | ·276 | .... | ·276 |
| Total | 270 | 144·683 | 165 | 143·977 |

Hence, it appears, that while from all causes 270 deaths happened in the Master Mariners' Society, the number of deaths which would have happened according to the mortality of the male population of England and Wales, as taken from p. 5 of "Contributions to Vital Statistics," is 144·683, being an increased mortality of upwards of 86 per cent., but if the mortality between the ages 21 and 60 only be taken, the increase is 90 per cent.

Again, the same abstract shows that while the mortality from natural causes was 165, the mortality according to the ratio for England and Wales was 143·977, being a difference of about 14·5 per cent., and if ages 21 to 60 only be included, the increase is about 18 per cent. This result certainly goes against the generally received opinion, that the deaths of mariners from natural causes only, is less than in the community generally, and shows the necessity of being very careful before drawing conclusions in the absence of clearly recorded and well analysed facts. There is no doubt that many inferences may be drawn from the data here presented, applicable to some of the questions at present agitated, in regard to the health of towns, and the sanitary condition of different districts, but as these speculations do not directly bear on the subject now under consideration, they had better not be entered upon.

Table IV. has been prepared in order to show whether the age, and, therefore, as a general rule, the experience of the captains of vessels, has any, and what influence on the losses of property under their charge. In this table, the "discontinued group" will consist of all causes of removal from the Society, whether by death or otherwise, as vessels could not be considered under the charge of members for an entire year, unless they were, without any interruption, members of the Society for the whole of that year, and, therefore, if death or any other cause removed them from the Society in the course of the year, a correction must be applied, as in column *p*, on that account.

### TABLE IV.

| Age. | Number Entered at each Age. | Number under Observation from Age preceding. | Total Number under Observation at each Age. | Wrecks. | | | | Discontinued. | | | | Half Discontinued and half Entered. | | | Number Exposed to Risk. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Wrecks. | Partial Wrecks. | Partial Loss by Fire. | Total. | Deaths. | Retired. | Alive. | Total. | Entered. | Discontinued. | Total. | |
| *a* | *b* | *c* | *d* | *e* | *f* | *g* | *h* | *i* | *k* | *l* | *m* | *n* | *o* | *p* | *q* |
| 19.. | 1 | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | ·5 | .. | ·5 | ·5 |
| 20.. | 2 | 1 | 3 | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | 1 | 2 |
| 21.. | 15 | 3 | 18 | .. | .. | .. | .. | .. | .. | 1 | 1 | 7·5 | ·5 | 8 | 10 |
| 22.. | 28 | 17 | 45 | .. | .. | .. | .. | .. | .. | .. | .. | 14 | .. | 14 | 31 |
| 23.. | 32 | 45 | 77 | 1 | 1 | .. | 2 | 1 | 1 | 1 | 3 | 16 | 1·5 | 17·5 | 59·5 |
| 24.. | 43 | 74 | 117 | 5 | 1 | .. | 6 | 3 | 1 | 3 | 7 | 21·5 | 3·5 | 25 | 92 |
| 25.. | 59 | 110 | 169 | 3 | 2 | .. | 5 | 2 | 3 | 1 | 6 | 29·5 | 3 | 32·5 | 136·5 |
| 26.. | 64 | 163 | 227 | 5 | .. | 1 | 6 | 7 | 3 | 6 | 16 | 32 | 8 | 40 | 187 |
| 27.. | 57 | 211 | 268 | 3 | 2 | .. | 5 | 2 | 6 | 9 | 17 | 28·5 | 8·5 | 37 | 231 |
| 28.. | 66 | 251 | 317 | 6 | 4 | .. | 10 | 6 | 7 | 5 | 18 | 33 | 9 | 42 | 275 |
| 29.. | 60 | 299 | 359 | 4 | 2 | .. | 6 | 8 | 9 | 11 | 28 | 30 | 14 | 44 | 315 |
| 30.. | 88 | 331 | 419 | 5 | 7 | .. | 12 | 8 | 10 | 12 | 30 | 44 | 15 | 59 | 360 |
| 31.. | 54 | 389 | 443 | 8 | 5 | .. | 13 | 6 | 9 | 28 | 43 | 27 | 21·5 | 48·5 | 394·5 |
| 32.. | 64 | 400 | 464 | 11 | .. | .. | 11 | 13 | 12 | 41 | 66 | 32 | 33 | 65 | 399 |
| 33.. | 65 | 398 | 463 | 7 | 6 | .. | 13 | 12 | 13 | 37 | 62 | 32·5 | 31 | 63·5 | 399·5 |
| 34.. | 93 | 401 | 494 | 9 | 1 | .. | 10 | 9 | 7 | 25 | 41 | 46·5 | 20·5 | 67 | 427 |
| 35.. | 77 | 453 | 530 | 14 | 4 | 1 | 19 | 13 | 5 | 38 | 56 | 38·5 | 28 | 66·5 | 463·5 |
| 36.. | 63 | 474 | 537 | 12 | 3 | .. | 15 | 7 | 15 | 33 | 55 | 31·5 | 27·5 | 59 | 478 |
| 37.. | 59 | 482 | 541 | 10 | 5 | .. | 15 | 8 | 11 | 57 | 76 | 29·5 | 38 | 67·5 | 473·5 |
| 38.. | 77 | 465 | 542 | 14 | .. | .. | 14 | 15 | 8 | 41 | 64 | 38·5 | 32 | 70·5 | 471·5 |
| 39.. | 70 | 478 | 548 | 9 | 3 | .. | 12 | 9 | 10 | 35 | 54 | 35 | 27 | 62 | 486 |
| 40.. | 58 | 494 | 552 | 12 | 5 | .. | 17 | 18 | 9 | 44 | 71 | 29 | 35·5 | 64·5 | 487·5 |
| 41.. | 42 | 481 | 523 | 7 | 9 | .. | 16 | 11 | 11 | 47 | 69 | 21 | 34·5 | 55·5 | 467·5 |
| 42.. | 33 | 454 | 487 | 6 | 2 | .. | 8 | 11 | 11 | 51 | 73 | 16·5 | 36·5 | 53· | 434 |
| 43.. | 46 | 414 | 460 | 8 | 3 | .. | 11 | 17 | 7 | 47 | 71 | 23 | 35·5 | 58·5 | 401·5 |
| 44.. | 44 | 389 | 433 | 11 | 3 | .. | 14 | 7 | .. | 43 | 50 | 22 | 25 | 47· | 386 |
| 45.. | 24 | 383 | 407 | 3 | .. | .. | 3 | 6 | 10 | 43 | 59 | 12 | 29·5 | 41·5 | 365·5 |
| 46.. | 15 | 348 | 363 | 6 | 5 | 1 | 12 | 11 | 5 | 42 | 58 | 7·5 | 29 | 36·5 | 326·5 |
| 47.. | 24 | 305 | 329 | 2 | 4 | .. | 6 | 5 | 9 | 54 | 68 | 12 | 34 | 46 | 283 |
| 48.. | 28 | 261 | 289 | 6 | .. | .. | 6 | 9 | 8 | 44 | 61 | 14 | 30·5 | 44·5 | 244·5 |
| 49.. | 28 | 228 | 256 | 2 | 1 | .. | 3 | 8 | 2 | 36 | 46 | 14 | 23 | 37 | 219 |
| 50.. | 13 | 210 | 223 | 2 | 4 | .. | 6 | 11 | 7 | 29 | 47 | 6·5 | 23·5 | 30 | 193 |
| 51.. | 4 | 176 | 180 | 6 | 1 | .. | 7 | 4 | 5 | 21 | 30 | 2 | 15 | 17 | 163 |
| 52.. | 12 | 150 | 160 | 6 | 2 | .. | 8 | 8 | 5 | 25 | 38 | 6 | 19 | 25 | 137 |
| 53.. | 15 | 124 | 139 | 3 | 1 | 1 | 5 | 1 | 7 | 13 | 21 | 7·5 | 10·5 | 18 | 121 |
| 54.. | 11 | 118 | 129 | 3 | .. | .. | 3 | 1 | 2 | 18 | 21 | 5·5 | 10·5 | 16 | 113 |
| 55.. | 5 | 108 | 113 | .. | 2 | 1 | 3 | 7 | 4 | 14 | 25 | 2·5 | 12·5 | 15 | 98 |
| 56.. | 4 | 88 | 92 | 1 | .. | .. | 1 | 1 | 4 | 10 | 15 | 2 | 7·5 | 9·5 | 82·5 |
| 57.. | .. | 77 | 77 | 1 | .. | .. | 1 | 1 | 4 | 12 | 17 | .. | 8·5 | 8·5 | 68·5 |
| 58.. | 3 | 60 | 63 | .. | 1 | .. | 1 | 1 | 2 | 8 | 11 | 1·5 | 5·5 | 7 | 56 |
| 59.. | .. | 52 | 52 | .. | .. | .. | .. | 1 | 1 | 11 | 13 | .. | 6·5 | 6·5 | 45·5 |
| 60.. | .. | .. | 39 | 1 | 1 | .. | 2 | 2 | .. | 12 | 14 | .. | 7 | 7 | 32 |
| 61.. | .. | .. | 25 | .. | .. | .. | .. | .. | .. | 3 | 3 | .. | 1·5 | 1·5 | 23·5 |
| 62.. | .. | .. | 22 | 1 | .. | .. | 1 | .. | .. | 5 | 5 | .. | 2·5 | 2·5 | 19·5 |
| 63.. | .. | .. | 17 | .. | .. | .. | .. | .. | 1 | 3 | 4 | .. | 2 | 2 | 15 |
| 64.. | .. | .. | 13 | .. | .. | .. | .. | .. | .. | 5 | 5 | .. | 2·5 | 2·5 | 10·5 |
| 65.. | .. | .. | 8 | .. | .. | .. | .. | .. | 1 | 3 | 4 | .. | 2 | 2 | 6 |
| 66.. | .. | .. | 4 | .. | .. | .. | .. | .. | .. | 2 | 2 | .. | 1 | 1 | 3 |
| 67.. | .. | .. | 2 | .. | .. | .. | .. | .. | .. | 2 | 2 | .. | 1 | 1 | 1 |
| 68.. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| | 1,546 | | 12,041 | 213 | 90 | 5 | 308 | 270 | 245 | 1,031 | 1,546 | 773·0 | 773·0 | 1546·0 | 10495·0 |

Of the 308 wrecks which have taken place, it will be observed that no less than 213 have been total wrecks, 90 partial wrecks, and 5 losses by fire.

The following abstract exhibits in a condensed form the results arrived at in this Table.

ABSTRACT E.

| Ages. | Number exposed to risk of Wreck. | Total Number of Wrecks. | | Per Centage, Yearly, of | | Total Losses. | |
|---|---|---|---|---|---|---|---|
| | | Total Wrecks. | Partial Wrecks. | Total Wrecks. | Partial Wrecks. | Number. | Per Centage. |
| 19—20........ | 2·5 | .... | .... | .... | .... | .... | .... |
| 21—25........ | 329·0 | 9 | 4 | 2·736 | 1·216 | 13 | 3·951 |
| 26—30........ | 1,368·0 | 23 | 15 | 1·681 | 1·096 | 39 | 2·851 |
| 31—35........ | 2,083·5 | 49 | 16 | 2·352 | 0·768 | 66 | 3·168 |
| 36—40........ | 2,396·5 | 57 | 16 | 2·378 | 0·667 | 73 | 3·046 |
| 41—45........ | 2,054·5 | 35 | 17 | 1·703 | 0·827 | 52 | 2·531 |
| 46—50........ | 1,266·0 | 18 | 14 | 1·422 | 1·106 | 33 | 2·607 |
| 51—55........ | 632·0 | 18 | 6 | 2·848 | 0·949 | 26 | 4·114 |
| 56—60........ | 284·5 | 3 | 2 | 1·054 | 0·703 | 5 | 1·757 |
| 61—65........ | 74·5 | 1 | .... | 1·342 | .... | 1 | 1·342 |
| 66—68........ | 4·0 | .... | .... | .... | .... | .... | .... |
| Total.... | 10,495·0 | 213 | 90 | 2·029 | 0·857 | 308 | 2·935 |

It will thus be seen, that at the younger ages, the wrecks and losses of property under the charge of master mariners, is greater than at the more advanced ages, and these facts, viewed in connection with the circumstance already alluded to, that the loss of life from accidental and extraordinary events is also more frequent at younger ages, strengthens the presumption, that increased years and experience among the captains of merchant vessels, give greater security to both life and property under their charge.

Having thus shown the principal results arrived at, attention will be next directed to the application of them to the monetary affairs of Life Offices. It is very much to be regretted, that the proprietors and managers of Life Assurance Companies should have given so very little attention to the nature of the risks which they are constantly undertaking, and have contributed little or nothing in a pecuniary point of view, to the investigation of those branches of science, by the application of which the shareholders have realized immense and most exorbitant profits, on the capital invested in such speculations. It is notorious, that notwithstanding many societies have at command a greater capital than some of the Governments of Europe, there is not a single public document extant, throwing light on the state and condition of any other class of the community than their own members, published at the expence of those societies. Of the very meagre quantity of information which does exist, all has been derived from other sources; and there is no wonder, therefore, that in these wealthy corporations there should exist the anomalous feature unknown to other matters of enterprise and industry, of the practice being much in advance of the science on which it should be founded; in fact, after the most diligent inquiries, a single instance has not been found of any one of these great and powerful Companies, which boast of their millions of invested capital, having spent 500*l.* in the original investigation of any single branch or deparment of vital statistics. It is, therefore, hoped that it will not be considered out of place to bring under the attention of this Society, the details of a question which, under other circumstances, would properly belong to the traders in the shares of Life Assurance Institutions.

In the preceding inquiry, an analysis has been made of the various causes of death. This is, no doubt, important as suggesting means by which, under sanitary regulations, the intensity of some of those forces may be lessened, but, for the general purposes of a Life Office, a knowledge of the gross rate of mortality, is all that is required. Attention is therefore now directed to the results given in abstract A, from which a Table of Decrements may be easily formed. In that abstract, the rate of mortality is given for quinquennial ages only, but the intermediate terms may be found in the following manner.

Let the figures in the second column of the following abstract represent the original quantities for quinquennial ages, derived from abstract A, and let the columns headed $\Delta_1$, $\Delta_2$, $\Delta_3$, be the 1st, 2nd, and 3rd differences of the original quantities, also let ($a$), ($b$), and ($c$), which are the second and every alternate quantity in each of the three last columns, be equal to $\cdot 2\Delta_1$, $\cdot 04\Delta_2$, and $\cdot 008\Delta_3$, respectively.

ABSTRACT F.

| Age. | (1). | $\Delta_1$ | $\Delta_2$ | $\Delta_3$ |
|---|---|---|---|---|
| 23 | 1·791 | + ·415 | − ·206 | − ·165 |
| | | $a$ = + ·0830 | $b$ = − ·00824 | $c$ = − ·001320 |
| 28 | 2·206 | + ·209 | − ·371 | + ·648 |
| | | $a$ = + ·0418 | $b$ = − ·01484 | $c$ = + ·005184 |
| 33 | 2·415 | − ·162 | + ·277 | + ·404 |
| | | $a$ = − ·0324 | $b$ = + ·01108 | $c$ = + ·003232 |
| 38 | 2·253 | + ·115 | + ·681 | − 1·589 |
| | | $a$ = + ·0230 | $b$ = + ·02724 | $c$ = − ·012712 |
| 43 | 2·368 | + ·796 | − ·908 | + 2·195 |
| | | $a$ = + ·1592 | $b$ = − ·03632 | $c$ = + ·017560 |
| 48 | 3·164 | − ·112 | + 1·287 | − 1·096 |
| | | $a$ = − ·0224 | $b$ = + ·05148 | $c$ = − ·008768 |
| 53 | 3·052 | + 1·175 | + ·191 | + ·521 |
| | | $a$ = + ·2350 | $b$ = + ·00764 | $c$ = + ·004168 |
| 58 | 4·227 | + 1·366 | + ·712 | |
| | | $a$ = + ·2732 | $b$ = + ·02848 | |
| 63 | 5·593 | + 2·078 | | |
| | | $a$ = + ·4156 | | |
| 68 | 7·671 | | | |

Then the intervals to be interpolated, being $\frac{1}{5}$, the intermediate terms to be inserted between the original quantities, will, therefore, be found as follows:

$$\left.\begin{array}{l} 1^{\text{ist}}\ \delta_1 = a - 2\,b + 6\,c \\ 1^{\text{ist}}\ \delta_2 = \quad .\ .\ b - 4\,c \\ \text{and}\ \delta_3 = \quad .\ .\ .\ .\ c \end{array}\right\}\ \text{in Abstract F.}$$

## ABSTRACT G.

| Age. | (1). | $\delta_1$ | $\delta_2$ | Age. | (1). | $\delta_1$ | $\delta_2$ |
|---|---|---|---|---|---|---|---|
| | | | | | | +·141640 | |
| 21 | 1·604280 | | | 46 | 3·077480 | | —·071440 |
| | | +·093520 | | | | ·070200 | |
| 22 | 1·697800 | | —·000320 | 47 | 3·147680 | | ·053880 |
| | | ·093200 | | | | +·016320 | |
| 23 | **1·791** | | ·001640 | 48 | **3·164** | | —·194288 |
| | | ·091560 | | | | —·177968 | |
| 24 | 1·882560 | | ·002960 | 49 | 2·986032 | | +·086552 |
| | | ·088600 | | | | ·091416 | |
| 25 | 1·971160 | | ·004280 | 50 | 2·894616 | | ·077784 |
| | | ·084320 | | | | —·013632 | |
| 26 | 2·055480 | | ·005600 | 51 | 2·880984 | | ·069016 |
| | | ·078720 | | | | +·055384 | |
| 27 | 2·134200 | | —·006920 | 52 | 2·936368 | | ·060248 |
| | | ·071800 | | | | ·115632 | |
| 28 | **2·206** | | +·030784 | 53 | **3·052** | | +·129096 |
| | | ·102584 | | | | ·244728 | |
| 29 | 2·308584 | | —·035576 | 54 | 3·296728 | | —·009032 |
| | | ·067008 | | | | ·235696 | |
| 30 | 2·375592 | | ·030392 | 55 | 3·532424 | | ·004864 |
| | | ·036616 | | | | ·230832 | |
| 31 | 2·412208 | | ·025208 | 56 | 3·763256 | | —·000696 |
| | | +·011408 | | | | ·230136 | |
| 32 | 2·423616 | | ·020024 | 57 | 3·993392 | | +·003472 |
| | | —·008616 | | | | ·233608 | |
| 33 | **2·415** | | ·026552 | 58 | **4·227** | | +·059384 |
| | | ·035168 | | | | ·292992 | |
| 34 | 2·379832 | | —·001848 | 59 | 4·519992 | | —·001128 |
| | | ·037016 | | | | ·291864 | |
| 35 | 2·342816 | | +·001384 | 60 | 4·811856 | | ·009896 |
| | | ·035632 | | | | ·281968 | |
| 36 | 2·307184 | | ·004616 | 61 | 5·093824 | | ·018664 |
| | | ·031016 | | | | ·263304 | |
| 37 | 2·276168 | | +·007848 | 62 | 5·357128 | | —·027432 |
| | | ·023168 | | | | ·235872 | |
| 38 | **2·253** | | —·084584 | 63 | **5·593** | | +·139440 |
| | | ·107752 | | | | ·375312 | |
| 39 | 2·145248 | | +·078088 | 64 | 5·968312 | | ·024312 |
| | | —·029664 | | | | ·399624 | |
| 40 | 2·115584 | | ·065376 | 65 | 6·367936 | | ·020144 |
| | | +·035712 | | | | ·419768 | |
| 41 | 2·151296 | | ·052664 | 66 | 6·787704 | | ·015976 |
| | | ·088376 | | | | ·435744 | |
| 42 | 2·239672 | | ·039952 | 67 | 7·223448 | | +·011808 |
| | | ·128328 | | | | +·447552 | |
| 43 | **2·368** | | +·208872 | 68 | **7·671** | | |
| | | ·337200 | | | | | |
| 44 | 2·70520 | | —·106560 | | | | |
| | | +·230640 | | | | | |
| 45 | 2·93584 | | —·089000 | | | | |

It will be observed that there is considerable irregularity in the original quantities, as taken from abstract A, but it was thought better not to disturb the natural results by any attempt to convert them into a graduated series. After the quinquennial period of life 50-55, the numbers are too small to warrant much reliance being placed on the results, and, therefore, subsequent to that period, an increasing series has been adopted, maintaining, as nearly as possible, the same relation at these advanced ages, to the ordinary tables of mortality for male life, which the figures in abstract A, for younger ages, bear to the general mortality of England and Wales.

From the results thus obtained, the following Table of Decrements is derived.

TABLE V.

| Age. | Mortality per Cent $= d$. | $\lambda\left(1-\frac{d}{100}\right)=c$<br>$5+\Sigma(c)=\lambda a$. | $a$ = Number Living. | Number Dying. | Age. | Mortality per Cent $= d$. | $\lambda\left(1-\frac{d}{100}\right)=c$<br>$5+\Sigma(c)=\lambda a$. | $a$ = Number Living. | Number Dying. |
|---|---|---|---|---|---|---|---|---|---|
| 21 | 1·604 | 5·0000000 | 100,000 | 1,604 | 40 | 2·116 | ·8198832 | 66,052 | 1,398 |
| 22 | 1·698 | 9·9929774<br>4·9929774 | 98,396 | 1,671 | 41 | 2·151 | ·9907117<br>·8105949 | 64,654 | 1,391 |
| 23 | 1·791 | ·9925624<br>·9855398 | 96,725 | 1,732 | 42 | 2·240 | ·9905564<br>·8011513 | 63,263 | 1,417 |
| 24 | 1·883 | ·9921513<br>·9776911 | 94,993 | 1,789 | 43 | 2·368 | ·9901612<br>·7913125 | 61,846 | 1,464 |
| 25 | 1·971 | ·9917443<br>·9694354 | 93,204 | 1,837 | 44 | 2·705 | ·9895922<br>·7809047 | 60,382 | 1,634 |
| 26 | 2·055 | ·9913546<br>·9607900 | 91,367 | 1,877 | 45 | 2·936 | ·9880905<br>·7689952 | 58,748 | 1,725 |
| 27 | 2·134 | ·9909823<br>·9517723 | 89,490 | 1,909 | 46 | 3·077 | ·9870582<br>·7560534 | 57,023 | 1,754 |
| 28 | 2·206 | ·9906318<br>·9424041 | 87,581 | 1,933 | 47 | 3·148 | ·9864268<br>·7424802 | 55,269 | 1,740 |
| 29 | 2·309 | ·9903122<br>·9327163 | 85,648 | 2,009 | 48 | 3·164 | ·9861086<br>·7285888 | 53,529 | 1,694 |
| 30 | 2·376 | ·9896946<br>·9224109 | 83,639 | 1,987 | 49 | 2·986 | ·9860368<br>·7146256 | 51,835 | 1,547 |
| 31 | 2·412 | ·9895566<br>·9119675 | 81,652 | 1,969 | 50 | 2·894 | ·9868344<br>·7014600 | 50,288 | 1,456 |
| 32 | 2·424 | ·9893964<br>·9013639 | 79,683 | 1,932 | 51 | 2·881 | ·9872461<br>·6887061 | 48,832 | 1,407 |
| 33 | 2·415 | ·9893430<br>·8907069 | 77,751 | 1,878 | 52 | 2·936 | ·9873042<br>·6760103 | 47,425 | 1,392 |
| 34 | 2·380 | ·9893831<br>·8800900 | 75,873 | 1,805 | 53 | 3·052 | ·9870582<br>·6630685 | 46,033 | 1,405 |
| 35 | 2·343 | ·9895388<br>·8696288 | 74,068 | 1,736 | 54 | 3·297 | ·9865389<br>·6496074 | 44,628 | 1,471 |
| 36 | 2·307 | ·9897034<br>·8593322 | 72,332 | 1,668 | 55 | 3·532 | ·9854399<br>·6350473 | 43,157 | 1,525 |
| 37 | 2·276 | ·9898634<br>·8491956 | 70,664 | 1,609 | 56 | 3·763 | ·9843833<br>·6194306 | 41,632 | 1,566 |
| 38 | 2·253 | ·9900012<br>·8391968 | 69,055 | 1,556 | 57 | 3·993 | ·9833421<br>·6027727 | 40,066 | 1,600 |
| 39 | 2·145 | ·9901034<br>·8293002<br>·9905830 | 67,499 | 1,447 | 58 | 4·227 | ·9823029<br>·5850756<br>·9812431 | 38,466 | 1,626 |

TABLE V.—*Continued.*

| Age. | Mortality per Cent $= d$. | $\lambda\left(1-\frac{d}{100}\right)=c$<br>$5+\Sigma(c)=\lambda a$ | $a$ = Number Living. | Number Dying. | Age. | Mortality per Cent $= d$. | $\lambda\left(1-\frac{d}{100}\right)=c$<br>$5+\Sigma(c)=\lambda a$. | $a$ = Number Living. | Number Dying. |
|---|---|---|---|---|---|---|---|---|---|
| 59 | 4·520 | ·5863187 | 36,840 | 1,665 | 80 | 18·384 | ·6738961 | 4,720 | 868 |
| 60 | 4·812 | ·9799124<br>·5462311 | 35,175 | 1,693 | 81 | 19·701 | ·9117753<br>·5856714 | 3,852 | 759 |
| 61 | 5·094 | 9·9785822<br>4·5248133 | 33,482 | 1,705 | 82 | 21·083 | ·9047101<br>·4903815 | 3,093 | 652 |
| 62 | 5·357 | 9·9772937<br>·5021070 | 31,777 | 1,703 | 83 | 22·762 | ·8971706<br>·3875521 | 2,441 | 556 |
| 63 | 5·593 | ·9760885<br>·4781955 | 30,074 | 1,682 | 84 | 24·080 | ·8878310<br>·2753831 | 1,885 | 454 |
| 64 | 5·968 | ·9750042<br>·4531997 | 28,392 | 1,694 | 85 | 25·672 | ·8803562<br>·1557393 | 1,431 | 367 |
| 65 | 6·368 | ·9732757<br>·4264754 | 26,698 | 1,700 | 86 | 27·262 | ·8711524<br>3·0268917 | 1,064 | 290 |
| 66 | 6·788 | ·9714243<br>·3978997 | 24,998 | 1,697 | 87 | 28·862 | ·8617614<br>2·8886531 | 774 | 224 |
| 67 | 7·223 | ·9694718<br>·3673715 | 23,301 | 1,683 | 88 | 30·567 | ·8521017<br>·7407548 | 550 | 168 |
| 68 | 7·671 | ·9674403<br>·3348118 | 21,618 | 1,658 | 89 | 32·112 | ·8415659<br>·5823207 | 382 | 122 |
| 69 | 8·228 | ·9653381<br>·3001499 | 19,960 | 1,643 | 90 | 33·802 | ·8317930<br>·4141137 | 260 | 88 |
| 70 | 8·813 | ·9627102<br>·2628601 | 18,317 | 1,618 | 91 | 35·282 | ·8208449<br>·2349586 | 172 | 61 |
| 71 | 9·487 | ·9598329<br>·2226930 | 16,699 | 1,584 | 92 | 36·557 | ·8110251<br>2·0459837 | 111 | 40 |
| 72 | 10·203 | ·9567110<br>·1794040 | 15,115 | 1,542 | 93 | 37·629 | ·8023837<br>1·8483674 | 71 | 27 |
| 73 | 11·026 | ·9532618<br>·1326658 | 13,573 | 1,497 | 94 | 38·467 | ·7949827<br>·6433501 | 44 | 17 |
| 74 | 11·909 | ·9492631<br>·0819289 | 12,076 | 1,438 | 95 | 39·051 | ·7891081<br>·4324582 | 27 | 11 |
| 75 | 12·881 | ·9449315<br>4·0268604 | 10,638 | 1,370 | 96 | 39·635 | ·7849666<br>1·2174248 | 16 | 6 |
| 76 | 13·874 | ·9401129<br>3·9669733 | 9,268 | 1,286 | 97 | 40·219 | ·7807852<br>0·9982100 | 10 | 4 |
| 77 | 14·957 | ·9351343<br>·9021076 | 7,982 | 1,194 | 98 | 40·803 | ·7765632<br>·7747732 | 6 | 2 |
| 78 | 16·040 | ·9296386<br>·8317462 | 6,788 | 1,089 | 99 | 41·387 | ·7722991<br>·5470729 | 4 | 2 |
| 79 | 17·191 | ·9240724<br>·7558186<br>·9180775 | 5,699 | 979 | 100 | 41·971 | 9·7679940<br>0·3150669 | 2 | |

From this has been constructed the following preparatory table for the determination of the values of annuities, assurances, and other risks on the lives of master mariners. Column D of Table VI. has been formed from the expression $^{m}a\,v^{m}$, in which $^{m}a$ represents the numbers living at the age $m$ in the fourth column of Table V., and $v^{m}$ represents the present value of 1*l.* due $m$ years hence, at 3 per cent. Also, if

$D_m$ = quantity in col. D, at any given age $m$, and

$D_{m+x}$ = do. do. at any variable higher age $m+x$

then, in the same Table, will $N_m = \Sigma\,(D_{m+x})$, in which $m+x$ receives every integral value from any given age, to the oldest age in the table.

TABLE VI.

| | Age. | λ·D | D | N | Age. | λ·D | D | N |
|---|---|---|---|---|---|---|---|---|
| 928 | 21.... | 4·7304183 | 53754·92 | ~~924~~568·52 | 61.... | 3·7417426 | 5517·50 | 45291·41 |
| 877 | 22.... | ·7105585 | 51352·14 | ~~873~~216·38 | 62.... | ·7061991 | 5083·92 | 40207·49 |
| 828 | 23.... | ·6902836 | 49009·88 | ~~824~~206·50 | 63.... | ·6694503 | 4671·43 | 35536·06 |
| 781 | 24.... | ·6695977 | 46730·20 | ~~777~~476·30 | 64.... | ·6316173 | 4281·71 | 31254·35 |
| 736 | 25.... | ·6485048 | 44514·84 | ~~732~~961·46 | 65.... | ·5920558 | 3908·91 | 27345·44 |
| 694 | 26.... | ·6270222 | 42366·46 | ~~690~~595·00 | 66.... | ·5506429 | 3553·39 | 23792·05 |
| 654 | 27.... | ·6051672 | 40287·21 | ~~650~~307.79 | 67.... | ·5072774 | 3215·71 | 20576·34 |
| 616 | 28.... | ·5829618 | 38279·11 | ~~612~~028·68 | 68.... | ·4618805 | 2896·55 | 17679·79 |
| 579 | 29.... | ·5604368 | 36344·34 | ~~575~~684·34 | 69.... | ·4143814 | 2596·46 | 15083·33 |
| 545 | 30.... | ·5372942 | 34458·32 | ~~541~~226·00 | 70.... | ·3642544 | 2313·42 | 12769·91 |
| 512 | 31.... | ·5140135 | 32659·80 | ~~508~~566·22 | 71.... | ·3112500 | 2047·62 | 10722·29 |
| 811 | 32.... | ·4905727 | 30943·73 | ~~477~~622·49 | 72.... | ·2551238 | 1799·38 | 8922·91 |
| 552 | 33.... | ·4670785 | 29314·23 | ~~448~~308·26 | 73.... | ·1955484 | 1568·73 | 7354·18 |
| 424 | 34.... | ·4436244 | 27773·10 | ~~420~~535·16 | 74.... | ·1319743 | 1355·11 | 5999·07 |
| 398 | 35.... | ·4203259 | 26322·42 | ~~394~~212·74 | 75.... | 3·0640685 | 1158·96 | 4840·114 |
| 373 | 36.... | ·3971921 | 24956·98 | ~~369~~255·76 | 76.... | 2·9913442 | 980·267 | 3859·847 |
| 349 | 37.... | ·3742183 | 23671·09 | ~~345~~584·67 | 77.... | ·9136413 | 819·674 | 3040·173 |
| 327 | 38.... | ·3513823 | 22458·58 | ~~323~~126·09 | 78.... | ·8304427 | 676·772 | 2363·401 |
| 305 | 39.... | ·3286484 | 21313·19 | ~~301~~812·90 | 79.... | ·7416778 | 551·668 | 1811·733 |
| 285 | 40.... | ·3063942 | 20248·56 | ~~281~~564·34 | 80.... | ·6469181 | 443·525 | 1368·208 |
| 266 | 41.... | ·2842687 | 19242·82 | ~~262~~321·52 | 81.... | ·5458562 | 351·444 | 1016·764 |
| 248 | 42.... | ·2619879 | 18280·49 | ~~244~~041·03 | 82.... | ·4377291 | 273·986 | 742·778 |
| 230 | 43.... | ·2393118 | 17350·49 | ~~226~~690·54 | 83.... | ·3220624 | 209·924 | 532·854 |
| 214 | 44.... | ·2160668 | 16446·24 | ~~210~~244·30 | 84.... | ·1970562 | 157·419 | 375·435 |
| 198 | 45.... | ·1913201 | 15535·31 | ~~194~~708·99 | 85.... | 2·0645752 | 116·031 | 259·4037 |
| 184 | 46.... | ·1655411 | 14640·00 | ~~180~~068·99 | 86.... | 1·9228904 | 83·7318 | 175·6719 |
| 170 | 47.... | ·1391306 | 13776·24 | ~~166~~292·75 | 87.... | ·7718146 | 59·1309 | 116·5410 |
| 157 | 48.... | ·1124020 | 12953·94 | ~~153~~338·81 | 88.... | ·6110790 | 40·8394 | 75·7016 |
| 145 | 49.... | ·0856016 | 12178·72 | ~~141~~160·09 | 89.... | ·4398077 | 27·5301 | 48·1715 |
| 133 | 50.... | ·0595988 | 11470·93 | ~~129~~689·16 | 90.... | ·2587635 | 18·1453 | 30·0262 |
| 122 | 51.... | ·0340076 | 10814·53 | ~~118~~874·63 | 91.... | 1·0667712 | 11·6620 | 18·3642 |
| 112 | 52.... | 4·0084746 | 10197·05 | ~~108~~677·58 | 92.... | 0·8649590 | 7·32755 | 11·03665 |
| 103 | 53.... | 3·9826956 | 9609·38 | ~~99~~067·20 | 93.... | ·6545055 | 4·51342 | 6·52323 |
| 94 | 54.... | ·9563973 | 9044·76 | ~~90~~022·44 | 94.... | ·4366510 | 2·73307 | 3·79016 |
| 85 | 55.... | ·9289999 | 8491·80 | ~~81~~530·64 | 95.... | 0·2129219 | 1·63276 | 2·15740 |
| 77 | 56.... | ·9005460 | 7953·27 | ~~73~~577·37 | 96.... | 9·9850512 | ·96616 | 1·19124 |
| 70 | 57.... | ·8710509 | 7431·06 | ~~66~~146·31 | 97.... | ·7529992 | ·56624 | ·62500 |
| 63 | 58.... | ·8405166 | 6926·54 | ~~59~~219·77 | 98.... | ·5167252 | ·32864 | ·29636 |
| 56 | 59.... | ·8089224 | 6440·54 | ~~52~~779·23 | 99.... | ·2761877 | ·18888 | ·10748 |
| 50 | 60.... | 3·7759976 | 5970·32 | ~~46~~808·91 | 100.... | 9·0313444 | ·10748 | ·00000 |

From Table V. preceding, and Table C, "Contributions to Vital Statistics," the following results have been obtained, shewing for different ages the equation of life for master mariners, and also for the male population of England and Wales.

| Ages. | Equation of Life. | | |
|---|---|---|---|
| | Mariners. | England and Wales. | Difference, per Cent. |
| 21............ | 29·1 | 44·0 | 51·2 |
| 30............ | 25·0 | 36·5 | 46·0 |
| 40............ | 20·9 | 28·8 | 37·8 |
| 50............ | 15·5 | 21·2 | 36·8 |
| 60............ | 10·5 | 14·3 | 36·2 |

The foregoing is sufficient to show the necessity of great caution in undertaking special risks on life, and the need of careful and extended statistical research, to form a basis for calculations in this branch of life contingencies. Within the last five or six years, Assurance Institutions have very much increased, and the public journals sufficiently testify to the remarkable efforts made by them to extend their business among all ranks and grades of society. It is, therefore, of the first importance that those entrusted with the management of such companies, should possess accurate statistical information, to guide them in their transactions with the public. The practice of a mere arbitrary imposition of premiums for special risks unfortunately prevails to too great an extent, and is liable to very serious objections. The hazard of charging inadequate terms, may endanger the safety of the institutions, and exorbitant rates limit the practice of life assurance, while the want of clear and satisfactory data, produces distrust among the managers themselves, and deprives their efforts of that confidence and energy, which is necessary to the successful development of every enterprise. It is, therefore, hoped that the preceding facts may not be void of practical value and importance, while to the mere scientific inquirer, their novelty will recommend them to some share of attention.

It has been thought better to submit a complete analysis of one class of facts, than to bring under review a variety of data in a cursory manner, but it may be satisfactory to view, in connection with the preceding data derived from the Master Mariners' Society exclusively, another body of facts originating in other sources, namely, in the other Mariners' Friendly Societies distributed over the kingdom, and embracing, generally, a humbler class of sea-faring men, than the master mariners.

| Ages. | Number exposed to risk. | Deaths. | Mortality, per Cent. | Mortality, per Cent., in the Master Mariners' Society. (Abstract A.) |
|---|---|---|---|---|
| 20—25........... | 1,562 | 39 | 2·4968 | 1·791 |
| 26—30........... | 5,060 | 108 | 2·1343 | 2·206 |
| 31—35........... | 6,842 | 167 | 2·4408 | 2·415 |
| 36—40........... | 7,549 | 184 | 2·4374 | 2·253 |
| 41—45........... | 5,783 | 152 | 2·6283 | 2·368 |
| 46—50........... | 3,227 | 104 | 3·2228 | 3·164 |
| 51—55........... | 1,716 | 62 | 3·6130 | 3·052 |
| 56—60........... | 651 | 12 | 1·8433 | 1·911 |
| 61—65........... | 119 | 2 | 1·6882 | .... |
| Total........ | 32,509 | 830 | 2·5531 | 2·423 |

The rate of mortality, it will be seen, differs but slightly in the two classes of results, and calls for no particular commentary. Connected with this last body of facts, there has also been made a return of the amount of sickness or invaliding, but the discussion of that part of the inquiry must be reserved for another occasion.